

pump that is capable of operating at a variety of user-determined speeds, where all the speeds are separated by at most 100 rpm increments over the operating range and the lowest operating speed is less than or equal to one-third of the maximum operating speed and greater than zero. Such a pump must include a variable speed drive and be distributed in commerce either:

(1) With a user interface that changes the speed in response to pre-programmed user preferences and allows the user to select the duration of each speed and/or the on/off times; or

(2) Without a user interface that changes the speed in response to pre-programmed user preferences and allows the user to select the duration of each speed and/or the on/off times, but is unable to operate without the presence of a user interface.

Variable speed drive means equipment capable of varying the speed of the motor.

Waterfall pump means a pool filter pump with a certified maximum head less than or equal to 30.0 feet, and a maximum speed less than or equal to 1,800 rpm.

Wet rotor circulator pump means a single stage, rotodynamic, close-coupled, wet rotor pump. Examples include, but are not limited to, pumps generally referred to in industry as CP1.

[81 FR 4145, Jan. 25, 2016, as amended at 82 FR 5742, Jan. 18, 2017; 82 FR 36920, Aug. 7, 2017; 87 FR 57298, Sept. 19, 2022]

§ 431.463 Materials incorporated by reference.

(a) *General.* Certain material is incorporated by reference into this subpart with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the U.S. Department of Energy (DOE) must publish a document in the FEDERAL REGISTER and the material must be available to the public. All approved incorporation by reference (IBR) material is available for inspection at DOE and at the National Archives and Records Administration (NARA). Contact DOE at: the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program,

Sixth Floor, 950 L'Enfant Plaza SW, Washington, DC 20024, (202) 586-9127, Buildings@ee.doe.gov, www.energy.gov/eere/buildings/building-technologies-office. For information on the availability of this material at NARA, email: fr.inspection@nara.gov, or go to: www.archives.gov/federal-register/cfr/ibr-locations.html. The material may be obtained from the sources in the following paragraphs:

(b) *CSA.* Canadian Standards Association, 5060 Spectrum Way, Suite 100, Mississauga, Ontario, L4W 5N6, Canada, (800) 463-6727. www.csagroup.org.

(1) CSA C747-2009 (Reaffirmed 2014), (“CSA C747-2009 (RA 2014)”), “Energy efficiency test methods for small motors,” CSA reaffirmed 2014, IBR approved for appendices B and C to this subpart, as follows:

(i) Section 1, “Scope”;

(ii) Section 3, “Definitions”;

(iii) Section 5, “General Test Requirements”; and

(iv) Section 6, “Test Method.”

(2) [Reserved]

(c) *FM.* FM Global, 1151 Boston-Providence Turnpike, P.O. Box 9102, Norwood, MA 02062, (781) 762-4300. www.fmglobal.com.

(1) FM Class Number 1319, “Approval Standard for Centrifugal Fire Pumps (Horizontal, End Suction Type),” January 2015, IBR approved for § 431.462.

(2) [Reserved]

(d) *HI.* Hydraulic Institute, 6 Campus Drive, First Floor North, Parsippany, NJ 07054-4406, 973-267-9700. www.Pumps.org.

(1) ANSI/HI 1.1-1.2-2014, (“ANSI/HI 1.1-1.2-2014”), “American National Standard for Rotodynamic Centrifugal Pumps for Nomenclature and Definitions,” approved October 30, 2014, section 1.1, “Types and nomenclature,” and section 1.2.9, “Rotodynamic pump icons,” IBR approved for § 431.462.

(2) ANSI/HI 2.1-2.2-2014, (“ANSI/HI 2.1-2.2-2014”), “American National Standard for Rotodynamic Vertical Pumps of Radial, Mixed, and Axial Flow Types for Nomenclature and Definitions,” approved April 8, 2014, section 2.1, “Types and nomenclature,” IBR approved for § 431.462.

(3) HI 40.6-2014, (“HI 40.6-2014”), “Methods for Rotodynamic Pump Efficiency Testing,” (except section

40.6.5.3, “Test report;” Appendix A, section A.7, “Testing at temperatures exceeding 30 °C (86 °F);” and Appendix B, “Reporting of test results (normative);” copyright 2014, IBR approved for appendix A to subpart Y of part 431.

(4) HI 40.6-2014, (“HI 40.6-2014-B”), “Methods for Rotodynamic Pump Efficiency Testing” (except sections 40.6.4.1 “Vertically suspended pumps”, 40.6.4.2 “Submersible pumps”, 40.6.5.3 “Test report”, 40.6.5.5 “Test conditions”, 40.6.5.5.2 “Speed of rotation during test”, and 40.6.6.1 “Translation of test results to rated speed of rotation”, Appendix A “Test arrangements (normative)”; A.7 “Testing at temperatures exceeding 30 °C (86 °F)”, and Appendix B, “Reporting of test results (normative)”), copyright 2014, IBR approved for appendices B and C to this subpart.

(5) HI 40.6-2021, *Hydraulic Institute Standard for Methods for Rotodynamic Pump Efficiency Testing*, approved February 17, 2021; IBR approved for appendix D to this subpart.

(6) HI 41.5-2022, *Hydraulic Institute Program Guideline for Circulator Pump Energy Rating Program*, approved June 16, 2022; IBR approved for appendix D to this subpart.

(e) IEEE. Institute of Electrical and Electronics Engineers, Inc., 45 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331, (732) 981-0060. <http://www.ieee.org>.

(1) IEEE Std 113-1985, (“IEEE 113-1985”), “IEEE Guide: Test Procedures for Direct-Current Machines,” copyright 1985, IBR approved for appendices B and C to this subpart, as follows:

(i) Section 3, Electrical Measurements and Power Sources for all Test Procedures:

(A) Section 3.1, “Instrument Selection Factors”; and

(B) Section 3.4 “Power Measurement”; and

(C) Section 3.5 “Power Sources”;

(ii) Section 4, Preliminary Tests:

(A) Section 4.1, Reference Conditions, Section 4.1.2, “Ambient Air”; and

(B) Section 4.1, Reference Conditions, Section 4.1.4 “Direction of Rotation”; and

(iii) Section 5, Performance Determination:

(A) Section 5.4, Efficiency, Section 5.4.1, “Reference Conditions”; and

(B) Section 5.4.3, Direct Measurements of Input and Output, Section 5.4.3.2 “Dynamometer or Torquemeter Method.”

(2) IEEE Std 114-2010, (“IEEE 114-2010”), “IEEE Standard Test Procedure for Single-Phase Induction Motors,” approved September 30, 2010, IBR approved for appendices B and C to this subpart, as follows:

(i) Section 3, “General tests”, Section 3.2, “Tests with load”; and

(ii) Section 4 “Testing facilities”; and

(iii) Section 5, “Measurements”;

(A) Section 5.2 “Mechanical measurements”; and

(B) Section 5.3 “Temperature measurements”; and

(iv) Section 6 “Tests.”

(f) NFPA. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471, (617) 770-3000. www.nfpa.org.

(1) NFPA 20, (“NFPA 20-2016”), “Standard for the Installation of Stationary Pumps for Fire Protection,” 2016 Edition, approved June 15, 2015, IBR approved for §431.462.

(2) [Reserved]

(g) NSF. NSF International. 789 N. Dixboro Road, Ann Arbor, MI 48105, (734) 769-8010. www.nsf.org.

(1) NSF/ANSI 50-2015, “Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities,” Annex C, “(normative Test methods for the evaluation of centrifugal pumps,” Section C.3, “Self-priming capability,” ANSI approved January 26, 2015, IBR approved for §431.462 and appendices B and C to this subpart.

(2) [Reserved]

(h) UL. UL, 333 Pfingsten Road, Northbrook, IL 60062, (847) 272-8800. ul.com.

(1) UL 448, (“ANSI/UL 448-2013”), “Standard for Safety Centrifugal Stationary Pumps for Fire-Protection Service,” 10th Edition, June 8, 2007, including revisions through July 12, 2013, IBR approved for §431.462.

(2) UL 1081, (“ANSI/UL 1081-2016”), “Standard for Swimming Pool Pumps, Filters, and Chlorinators,” 7th Edition,

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ANSI approved October 21, 2016, IBR approved for § 431.462.

[81 FR 4145, Jan. 25, 2016, as amended at 82 FR 36920, Aug. 7, 2017; 87 FR 57299, Sept. 19, 2022]

§ 431.464 Test procedure for the measurement of energy efficiency, energy consumption, and other performance factors of pumps.

(a) *General pumps*—(1) *Scope*. This paragraph (a) provides the test procedures for determining the constant and variable load pump energy index for:

(i) The following categories of clean water pumps:

(A) End suction close-coupled (ESCC);

(B) End suction frame mounted/own bearings (ESFM);

(C) In-line (IL);

(D) Radially split, multi-stage, vertical, in-line casing diffuser (RSV); and

(E) Submersible turbine (ST) pumps.

(ii) With the following characteristics:

(A) Flow rate of 25 gpm or greater at BEP and full impeller diameter;

(B) Maximum head of 459 feet at BEP and full impeller diameter and the number of stages required for testing (see section 1.2.2 of appendix A of this subpart);

(C) Design temperature range from 14 to 248 °F;

(D) Designed to operate with either:

(1) A 2- or 4-pole induction motor; or

(2) A non-induction motor with a speed of rotation operating range that includes speeds of rotation between 2,880 and 4,320 revolutions per minute (rpm) and/or 1,440 and 2,160 rpm, and in either case, the driver and impeller must rotate at the same speed;

(E) For ST pumps, a 6-inch or smaller bowl diameter; and

(F) For ESCC and ESFM pumps, a specific speed less than or equal to 5,000 when calculated using U.S. customary units.

(iii) Except for the following pumps:

(A) Fire pumps;

(B) Self-priming pumps;

(C) Prime-assist pumps;

(D) Magnet driven pumps;

(E) Pumps designed to be used in a nuclear facility subject to 10 CFR part

10 CFR Ch. II (1–1–23 Edition)

50, “Domestic Licensing of Production and Utilization Facilities”; and

(F) Pumps meeting the design and construction requirements set forth in Military Specifications: MIL-P-17639F, “Pumps, Centrifugal, Miscellaneous Service, Naval Shipboard Use” (as amended); MIL-P-17881D, “Pumps, Centrifugal, Boiler Feed, (Multi-Stage)” (as amended); MIL-P-17840C, “Pumps, Centrifugal, Close-Coupled, Navy Standard (For Surface Ship Application)” (as amended); MIL-P-18682D, “Pump, Centrifugal, Main Condenser Circulating, Naval Shipboard” (as amended); and MIL-P-18472G, “Pumps, Centrifugal, Condensate, Feed Booster, Waste Heat Boiler, And Distilling Plant” (as amended). Military specifications and standards are available for review at <http://everyspec.com/MIL-SPECS>.

(2) *Testing and calculations*. Determine the applicable constant load pump energy index (PEI_{CL}) or variable load pump energy index (PEI_{VL}) using the test procedure set forth in appendix A of this subpart.

(b) *Dedicated-purpose pool pumps*—(1) *Scope*. This paragraph (b) provides the test procedures for determining the weighted energy factor (WEF), rated hydraulic horsepower, dedicated-purpose pool pump nominal motor horsepower, dedicated-purpose pool pump motor total horsepower, dedicated-purpose pool pump service factor, and other pump performance parameters for:

(i) The following varieties of dedicated-purpose pool pumps:

(A) Self-priming pool filter pumps;

(B) Non-self-priming pool filter pumps;

(C) Waterfall pumps; and

(D) Pressure cleaner booster pumps;

(ii) Served by single-phase or poly-phase input power;

(iii) Except for:

(A) Submersible pumps; and

(B) Self-priming and non-self-priming pool filter pumps with hydraulic output power greater than or equal to 2.5 horsepower.

(2) *Testing and calculations*. Determine the weighted energy factor (WEF) using the test procedure set forth in appendix B or appendix C of this subpart, as applicable.